Notice of Allowability	Application No.	Applicant(s)	
	10/007,190	RIEDLE, LINDA ANN	
	Examiner	Art Unit	
	Cheryl M. Reid	2142	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *November 07, 2001*.

2. ☒ The allowed claim(s) is/are *1-28*.

3. ☐ The drawings filed on _____ are accepted by the Examiner.

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☒ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date 7292005.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date 11/07/01
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☒ Interview Summary (PTO-413), Paper No./Mail Date *7/29/05* .
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

Andrew Caldwell

ANDREW CALDWELL
SUPERVISORY PATENT EXAMINER

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

2. Authorization for this examiner's amendment was given in a telephone interview with Eustace Isidore (Reg. No.56104) on June 29, 2005.

AMENDMENTS IN THE CLAIMS

1. (original) A system for tracking missing packets at a receiving terminal of a network transmission comprising:

processing logic;

a memory in which incoming packets and a tracking array are stored;

means for determining a maximum number N, corresponding to the number of sequentially numbered spaces within said tracking array utilized for tracking said incoming packets;

means for receiving an incoming packet and identifying a sequence number, M, of said incoming packet;

means, responsive to receipt of a packet with sequence number, M, that is greater than a current maximum number that may be tracked by said tracking array, for compressing spaces within said tracking array in multiples of X, where X is an integer, and N is a multiple of X, to create an array of N group values, wherein each group value indicates whether or not each packet within a particular group of packets assigned to a particular array space was received, wherein a number of packets within said particular group is initially 1 and increases by a factor of X after each compression; and

means for setting a value of said particular array space of said tracking array to a first value indicating receipt of all packets within said particular group of packets, wherein said value is set to a second value when all of said packets within said particular group of packets have not been received.

2. (original) The system of Claim 1, further comprising:

means, responsive to a receipt of a final packet of a file being transmitted, for checking said array for occurrence of holes, each hole representing that at least one packet within a group was not received; and

means for issuing a request for each packet within a group whose array space contains a hole, wherein an entire group is re-requested when said hole is found.

3. (original) The system of Claim 1, wherein:

Y packets are received at a time by said receiving terminal, where Y is an integer with value greater than 1, and said Y packets may be received out of sequential order with respect to each other;

said system further comprising:

means for tracking each packet in a buffered storage area comprising a current group and at least one previous group, wherein each of said received packets are sorted into their respective groups before a received status of a group corresponding to the received packets is recorded within the array.

4. (original) The system of Claim 3, wherein said tracking means further comprises:

means, responsive to a packet being in said at least one previous group or said current group, for respectively updating a status of said previous group or said current group within said buffer.

5. (original) The system of Claim 4, wherein, responsive to all packets of a group being received, said system further comprises:

means for updating a received status of said group within said array to indicate receipt of said group; and

means for moving said group out of said buffer.

6. (original) The system of Claim 5, wherein said group is a previous group, said system further comprising:

means for identifying said current group as a previous group, wherein a next group is selected as the current group; and

means, when a final packet has not been received, for subsequently tracking packets for said next current group within said buffer.

7. (original) The system of Claim 5, wherein said updating step further comprises:

means, responsive to a receipt of a new packet not within said current group or said at least one previous group, for moving a first created previous group out of said buffer; and

means for updating a received status of said first created previous group within said array to indicate non-receipt of each packet of said first created previous group.

8. (original) The system of Claim 7, wherein N is a multiple of 2, X is 2 and L is the number of packets in a current group, said system further comprising means for determining a group space, P, of a received packet by dividing said sequence number, M, of said packet by L, wherein a sum of a resulting quotient of said division + 1 indicates the group space within the array and a remainder of said division indicates the position of the received packet within the particular group.

9. (original) The system of Claim 1, said compression means further comprising means for ANDing each value within X adjacent spaces of said array to create a first set of group values stored within a first section of said array, wherein a second set of group values are determined when packets within subsequent groups are received after the compression and stored in a second section of said array.

10. (currently amended)A computer program product comprising:

a tangible computer readable medium; and

program code on said computer readable medium for tracking missing packets at a receiving terminal of a network transmission, said program code including code for:

determining a maximum number N, corresponding to the number of sequentially numbered spaces within said tracking array utilized for tracking said incoming packets;

receiving an incoming packet and identifying a sequence number, M, of said incoming packet;

responsive to receipt of a packet with sequence number, M, that is greater than a current maximum number that may be tracked by said tracking array, compressing spaces within said tracking array in multiples of X, where X is an integer, and N is a multiple of X, to create an array of N group values, wherein each group value indicates whether or not each packet within a particular group of packets assigned to a particular array space was received, wherein a number of packets within said particular group is initially 1 and increases by a factor of X after each compression; and

setting a value of said particular array space of said tracking array to a first value indicating receipt of all packets within said particular group of packets, wherein said value is set to a second value when all of said packets within said particular group of packets have not been received.

11. (original) The computer program product of Claim 10, further comprising program code for:

responsive to a receipt of a final packet of a file being transmitted, checking said array for occurrence of holes, each hole representing that at least one packet within a group was not received; and

issuing a request for each packet within a group whose array space contains a hole, wherein an entire group is re-requested when said hole is found.

12. (original) The computer program product of Claim 10, wherein:

Y packets are received at a time by said receiving terminal, where Y is an integer with value greater than 1, and said Y packets may be received out of sequential order with respect to each other;

said computer program product further comprising program code for:

tracking each packet in a buffered storage area comprising a current group and at least one previous group, wherein each of said received packets are sorted into their respective groups before a received status of a group corresponding to the received packets is recorded within the array.

13. (original) The computer program product of Claim 12, wherein said program code for tracking further comprises program code for:

responsive to a packet being in said at least one previous group or said current group, respectively updating a status of said previous group or said current group within said buffer.

14. (original) The computer program product of Claim 13, wherein, responsive to all packets of a group being received, said computer program product further comprises program code for:

updating a received status of said group within said array to indicate receipt of said group; and

moving said group out of said buffer.

15. (original) The computer program product of Claim 14, wherein said group is a previous group, said computer program product further comprising program code for:

identifying said current group as a previous group, wherein a next group is selected as the current group; and

when a final packet has not been received, subsequently tracking packets for said next current group within said buffer.

16. (original) The computer program product of Claim 14, wherein said program code for updating further comprises program code for:

responsive to a receipt of a new packet not within said current group or said at least one previous group, moving a first created previous group out of said buffer; and

updating a received status of said first created previous group within said array to indicate non-receipt of each packet of said first created previous group.

17. (original) The computer program product of Claim 16, wherein N is a multiple of 2, X is 2 and L is the number of packets in a current group, said computer program product further comprising program code for determining a group space, P, of a

received packet by dividing said sequence number, M, of said packet by L, wherein a sum of a resulting quotient of said division + 1 indicates the group space within the array and a remainder of said division indicates the position of the received packet within the particular group.

18. (original) The computer program product of Claim 10, said program code for compressing said array further comprises code for ANDing each value within X adjacent spaces of said array to create a first set of group values stored within a first section of said array, wherein a second set of group values are determined when packets within subsequent groups are received after the compression and stored in a second section of said array.

19. (original) A communication network comprising:

a transmitting agent that transmits a file as a plurality of sequentially numbered packets; and

at least one receiving agent that receives said packet, wherein said receiving agent comprises:

processing logic;

a memory in which incoming packets and a tracking array are stored;

means for determining a maximum number N, corresponding to the number of sequentially numbered spaces within said tracking array utilized for tracking said incoming packets;

means for receiving an incoming packet and identifying a sequence number, M, of said incoming packet;

means, responsive to receipt of a packet with sequence number, M, that is greater than a current maximum number that may be tracked by said tracking array, for compressing spaces within said tracking array in multiples of X, where X is an integer, and N is a multiple of X, to create an array of N group values, wherein each group value indicates whether or not each packet within a particular group of packets assigned to a particular array space was received,

wherein a number of packets within said particular group is initially 1 and increases by a factor of X after each compression; and

means for setting a value of said particular array space of said tracking array to a first value indicating receipt of all packets within said particular group of packets, wherein said value is set to a second value when all of said packets within said particular group of packets have not been received.

20. (original) The communication network of Claim 19, further comprising:

means, responsive to a receipt of a final packet of a file being transmitted, for checking said array for occurrence of holes, each hole representing that at least one packet within a group was not received; and

means for issuing a request for each packet within a group whose array space contains a hole, wherein an entire group is re-requested when said hole is found.

21. (original) The communication network of Claim 19, wherein:

Y packets are received at a time by said receiving terminal, where Y is an integer with value greater than 1, and said Y packets may be received out of sequential order with respect to each other;

said communication network further comprising:

means for tracking each packet in a buffered storage area comprising a current group and at least one previous group, wherein each of said received packets are sorted into their respective groups before a received status of a group corresponding to the received packets is recorded within the array.

22. (original) The communication network of Claim 21, wherein said tracking means further comprises:

means, responsive to a packet being in said at least one previous group or said current group, for respectively updating a status of said previous group or said current group within said buffer.

23. (original) The communication network of Claim 22, wherein, responsive to all packets of a group being received, said communication network further comprises:

means for updating a received status of said group within said array to indicate receipt of said group; and

means for moving said group out of said buffer.

24. (original) The communication network of Claim 23, wherein said group is a previous group, said communication network further comprising:

means for identifying said current group as a previous group, wherein a next group is selected as the current group; and

means, when a final packet has not been received, for subsequently tracking packets for said next current group within said buffer.

25. (original) The communication network of Claim 23, wherein said updating means further comprises:

means, responsive to a receipt of a new packet not within said current group or said at least one previous group, for moving a first created previous group out of said buffer; and

means for updating a received status of said first created previous group within said array to indicate non-receipt of each packet of said first created previous group.

26. (original) The communication network of Claim 25, wherein N is a multiple of 2, X is 2 and L is the number of packets in a current group, said communication network further comprising:

means for determining a group space, P, of a received packet by dividing said sequence number, M, of said packet by L, wherein a sum of a resulting quotient of said division + 1 indicates the group space within the array and a remainder of said division indicates the position of the received packet within the particular group.

27. (original) The communication network of Claim 19, wherein said network supports multicast transmission.

28. (original) The communication network of Claim 19, wherein said compression means further comprises means for ANDing each value within X adjacent spaces of said array to create a first set of group values stored within a first section of said array, wherein a second set of group values are determined when packets within subsequent groups are received after the compression and stored in a second section of said array.

THE SPECIFICATION HAS BEEN AMENDED AS FOLLOWS: *Please replace the paragraph beginning on page 15, line 27, with the following:*

According to the illustrative embodiment, an array is utilized to track the 32-bit sequence numbers within a 32-bit header field, and therefore the array spaces required increases sequentially from 1 to 216 (or zero to 216–1). Figure 3A illustrates a sample array, which may be utilized to track incoming packets. Array [[301]] **300** comprises 64K spaces, number 1 to 216. Each space is able to store a single bit value of 1 or 0. According to an illustrative embodiment, a "1" indicates that the packet (or packets as described below) have transmitted correctly to the receiver. A "0" indicates that the packet did not transmit correctly, i.e., it was lost during transmission, was never received, or has an error causing it to show up as missing (in advanced systems). [[301]] 300 is stored within memory of the receiving client (e.g., clients 207A-207D). The values within array are set by the network controllers (or processors) 117 of each client. For example, when a packet is received, the network controller 117 queries the packet for its sequence number, and locates the position/space within the array corresponding to the sequence number. The position/space is tagged (i.e., value set to 1) to indicate that the packet has been received. According to the illustrative embodiment, the invention processes reset the entire array to reflect all 0s prior to or on receipt of the first packet of a transmission.

Please replace the paragraph beginning on page 18, line 21, with the following:

Figure 3B generally illustrates the different groupings of packets **301** available under ATCA according to the preferred implementation of the invention. Column 1 indicates packet sized groups for packets 1 to 2^{16} (i.e., group size = 2^0). Each array location has a corresponding sequence number. After the first grouping/compression is triggered, the values within the location for packet's 1 and 2 are combined as indicated by the transition from column1 to column 2. Combination of the values includes ANDing the current values and storing the result of the operation in the new group position. The ANDing operation is a logic operation which may be carried out by hardware processor logic such as adder 309 or by software code. Once the results of the first combine operation is completed, the value is stored in the first array [[spot]] space 303 to represent group 1. Likewise, when the last array [[spot]] is taken for the 2-packet groups, the first two 2-packet groups are combined into the first array [[spot]] space 305 to represent the new group 1. Thus, the array space 305 actually comprises combined information about the receipt of all first four packets transmitted. The value of array space [[305]] 307 is set to 1 if all of the 4 initial spaces (representing packets 1 to 4) were set to 1, and array space [[305]] 307 is set to 0 if any one of the four initial space held a 0 value. Similarly, the value of array space 307 is set to 1 if all of the 64 initial spaces (representing packets 1 to 64) were set to 1, and array space 307 is set to 0 if any one of the 64 initial spaces held a 0 value.

Reasons for Allowance

3. The following is an examiner's statement of reasons for allowance: The closest art retrieved in the search is MeLampy et al (US 2003/0016627) hereinafter referred to as Melampy. Melampy teaches of receiving an incoming packet and identifying a sequence number (Page 11, 1st column, lines 64-67) and using an array to keep track of lost packets (Paragraph [0047-0049].

4. The prior art references of record do not teach or suggest (alone or in combination) all the limitations together within the independent claims. For example, the independent claims 1,10, and 19 contains the limitation "means for receiving an incoming packet and identifying a sequence number, M, of said incoming packet; means, responsive to receipt of a packet with sequence number, M, that is greater than a current maximum number that may be tracked by said tracking array, for compressing spaces within said tracking array in multiples of X, where X is an integer, and N is a multiple of X, to create an array of N group values " . This, in combination with the remaining limitations of independent claims 1,10, and 19 could not be found in the prior art was not considered obvious in view of the prior art. Therefore, the independent claims 1, 10, and 19 have allowable subject matter and are allowable over the prior art of record. The dependent claims of these claims are also allowable.

5. Claims 1-28 are allowable.

6. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably

accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Cheryl M. Reid whose telephone number is 571 272 3903. The examiner can normally be reached on Mon- Fri (7-3:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrew Caldwell can be reached on (571)272-3868. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Andrew Caldwell

cmr

ANDREW CALDWELL
SUPERVISORY PATENT EXAMINER